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EXAMINER	
EDWARDS, PATRICK L	
ART UNIT	**PAPER NUMBER**
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/840,193	KAWANO, TSUTOMU	
	Examiner	Art Unit	
	Patrick L Edwards	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) *11-29,31 and 32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 30* is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08-23-2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-10 and 30 in the reply filed on July 19, 2004 is acknowledged.

Claim Objections

2. Claims 1 and 30 are objected to because of the following informalities:

The first paragraph in the body of claim 1 contains the phrase, "where the object is radiographed for the radiation image." This phraseology is awkward and seemingly redundant. This same objection can be applied to the second paragraph in the body of claim 30.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-10 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claims 1 and 30, the metes and bounds of the term "feature amount" are not clear as currently recited in the claim. What does this "feature amount" represent?

Additionally referring to claims 1 and 30, these claims recite a means for extracting an object from an image. The claims go on to recite a means for recognizing a contour based on the extracted object region. It is well known in the art that a contour is the outline (or border) that defines an object. Therefore, it is not understood how the step of recognizing a contour of an object can be separated from the step of extracting the object. If an object in an image is defined by a contour, then the recognition of the contours is an inherent step in the extraction of the object. If an object has been extracted, have its contours not already been recognized? How can an object region be extracted if its borders haven't been defined?

Referring to claim 2, the claim recites that the contour recognizing means uses a position change of a boundary of the object region. It is well known in the art that a contour is the outline (or border) that defines an object region. It logically follows that the contours of an image define the position changes of the object region's boundary. Therefore, it is not clear to the examiner how or why the contour recognizing means would use a postion change of the object region's boundary. If a contour of the object has been recognized, wouldn't the position

changes of the object region's boundary have already been determined? Aren't the contour of an object region and the boundary of an object region the exact same thing? If not, how do they differ?

Referring to claims 3-5, these claims are indefinite for the reasons stated in the above paragraph with respect to claim 2. The limitations recited in these claims appear to be paradoxical in nature.

Referring specifically to claim 3, the last paragraph of the claim recites "classifying plural position change amounts into plural patterns prepared in advance". The phrase "prepared in advance" as used in this context is unclear. How can the patterns be prepared in advance when each and every radiographic image will have different objects which will have different contours? Consequently, the boundary points that lie on the contour will have different change amounts associated with them. With this information in mind, it is unclear how plural patterns are prepared in advance? Are they prepared in advance of the scanning, or of the contour specification?? Are the plural patterns prepared without prior knowledge of the boundary points?

The above rejection to claim is also applicable to claim 7, which uses similar language in the final paragraph of the claim.

Referring to claim 6, the claim recites that the contour recognizing means uses the width of the object region itself. It is well known in the art that a contour is the outline (or border) that defines an object region. It follows that the width of an object region in an image is defined by the object's contour. Inherently, the width of an object region can not be determined until after the contour of the object has been fully defined (or recognized). Therefore, it is unclear to the examiner how or why the contour recognizing means could use the width of the object region. It would appear that the recognition of an object's contour would be a pre-requisite for the determination of the object's width. How can the contour recognizing means use the width of the object, when the width can not be determined until after the contour recognition is complete?

Referring again to claim 7, this claim is indefinite for the reasons stated in the above paragraph with respect to claim 6. The limitations recited in these claims appear to be paradoxical in nature.

Claims 8-10 are rejected because they are dependent on indefinite claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 8 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kido et al. (USPN 5,732,149).

With regard to claim 1, which is representative of claim 30, Kido discloses an object region extraction means that detects an amount of radiation energy transmitted through an object, and extracts an object region

corresponding to this detected amount (Kido col. 6 line 65 – col. 7 line 4: The Kido reference teaches extracting an irradiated field region in a radiation image. The irradiated field region disclosed in Kido is analogous to the "object region" recited in the claim. Since this extraction is performed on a radiation image, we can conclude that it is based on the amount of radiation energy trasmitted through the object (see Figure 4)).

Kido further discloses a contour recognizing means that recognizes a contour based on the extracted object region (Kido col. 13 lines 6 – 23: The Kido reference teaches finding a boundary point region. This is analogous to recognizing a contour of an object as recited in the claim).

Kido further discloses that the contour recognizing means extracts a feature amount (Kido col. 13 lines 13-20: The Kido reference teaches determining a characteristic value. This is analogous to the extracting of feature amounts as recited in the claim).

With regard to claim 2, Kido further discloses that the contour recognizing means uses a position change of a boundary of the objection region (Kido col. 13 lines 35-59: The Kido reference discloses using positional information of a detected boundary point as a starting point in searching for an adjacent boundary point. We can conclude, therefore, that the contour recognizing means is using this position change information. Furthermore, any image processing apparatus that detects the contours of an object (i.e. the line that forms the border of an object in an image) inherently uses position changes of the boundary in the detection process.))

With regard to claim 8, Kido further discloses that a body part in a radiation image is recognized by using a feature amount obtained in the contour recognizing means (Kido col. 14 lines 32-43, 61-64: The Kido reference discloses recognizing a body part (i.e. chest, abdoment, etc. as is stated on lines 61-64) using characteristic values (which are analogous to the claimed "feature amount")).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. as applied to claim 1 above, and further in view of Yasui et al. (USPN 6,493,458 B2). The arguments as to the relevance of Kido as applied in claim 1 above are incorporated herein.

With regard to claims 6 and 7, Kido discloses a radiation image processing apparatus with a contour recognizing means.

Kido also discloses a region boundary point detecting means that detects a boundary of the object region (Kido col. 14 lines 38-43).

Kido further discloses that the region boundary point detecting means uses plural different scanning lines which scan successively from one end to the other end of an image with respect to the horizontal direction, and extracts a target pixel as a region boundary point when the target pixel existing on each scanning line is included in the object region and an arbitrary neighbor pixel near the target pixel is not included in the object region (Kido col. 13 lines 8-23: The Kido reference discloses raster scanning to find the region boundary points. As is well known in the art, raster scanning comprises scanning plural scanning lines successively from one end to the other end of an image in the horizontal direction).

Kido fails to expressly disclose that the contour recognizing means uses local region widths of the object region. Yasui, however, discloses a contour recognizing means (Yasui col. 8 line 4) which uses local region widths of the object region (Yasui col. 22 lines 26-33 with Figure 29). Yasui further discloses calculating a distance between plural region boundary points among the region boundary points existing on the same scanning line as a region width for each of the plural scanning lines (again, see Figure 29 of Yasui: This figure shows horizontal lines which are analogous to scanning lines, and which calculate the distance (i.e. the width) between two boundary points for each scanning line).

Yasui further discloses a contour specifying means that specifies a contour from the region widths calculated by the region width calculating means (Yasui col. 22 lines 26-33 with Figure 29). Yasui further discloses that the contour specifying means specifies a contour by classifying the contour into plural patterns, prepared in advance of the creation of the final road contour, from the region width for each of the scanning lines (again, see Figure 29 of Yasui: The horizontal arrows represent widths which define the object region and establish the plural patterns (i.e. the lines which connect each of the horizontal width-determining arrows qualify as the 'plural patterns' recited in the claim).

It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Kido's contour recognizing means by determining the borders of the object region (and hence the contour) by calculating the width of each region on every scanning line as taught by Yasui. Such a modification would have allowed for an accurate, reliable method of determining the boundary (i.e. contour) of a localized object region (Yasui col. 2 line 61 – col. 3 line 10).

9. Claims 3-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. as applied to claims 1 and 2 above, and further in view of Armato, III et al. (USPN 6,335,980) (herein 'Armato'). The arguments as to the relevance of Kido as applied above are incorporated herein.

With regard to claim 3, Kido discloses a region boundary point detecting means that detects a boundary of the object region (Kido col. 14 lines 38-43).

Kido further discloses that the region boundary point detecting means uses plural different scanning lines which scan successively from one end to the other end of an image with respect to the horizontal direction, and extracts a target pixel as a region boundary point when the target pixel existing on each scanning line is included in the object region and an arbitrary neighbor pixel near the target pixel is not included in the object region (Kido col. 13 lines 8-23: The Kido reference discloses raster scanning to find the region boundary points. As is well known in the art, raster scanning comprises scanning plural scanning lines successively from one end to the other end of an image in the horizontal direction).

Kido discloses determining adjacent region boundary points with respect to already found region boundary points and connecting these adjacent boundary points to create the image boundary. These region boundary points are inherently associated with a spatial position, and therefore each of them are separated by a certain spatial distance amount. Kido, though, fails to expressly disclose the calculation of this distance. The Kido reference, therefore, is insufficient to meet the claimed limitations regarding a "position change amount calculating means".

Armato, however, discloses a position change amount calculating means that calculates a position change amount of a boundary of the object region from plural region boundary points detected by the region boundary point detecting means (Armato col. 5 lines 56-64 and Figure 7: The Armato reference discloses comparing the x and y coordinates of the detected boundary points with the neighboring boundary points along the boundary to determine displacement values. This is analogous to the calculation of a position change amount as recited in the claim.

Armato further discloses a contour specifying means that specifies a contour from the position change amount calculated by the position change amount calculating means (Armato col. 5 lines 56-64 with Figure 7: Figure 7 of the Armato reference shows how the calculated displacement values specify the contour (i.e. border)).

Armato further discloses that the position change amount calculating means obtains an amount of position change from another adjoining region boundary point with respect to a plurality of region boundary points (Armato col. 5 lines 56-64 with Figure 7, and col. 7 lines 47-52: The Armato reference discloses determining the change amount with respect to previous boundary points).

Armato further discloses that the contour specifying means specifies a contour by classifying plural position change amounts into plural patterns, prepared in advance of the creation of the final contour (Armato col. 8 lines 4-26: The Armato reference discloses classifying plural position change amounts into plural curves. The plural curves disclosed in Armata are analogous to plural patterns as recited in the claim.

It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Kido's image contour recognizing means by using the spatial difference values between adjoining boundary points in order to specify a contour as taught by Armato. Such a modification would have allowed for a computationally efficient determination of a contour of a body part in a radiographic image (Armato col. 8 lines 1-25).

With regard to claims 4 and 5, Armato further discloses that the position change amount is a distance between neighboring region boundary points (Armato col. 7 lines 47-53: The Armato reference discloses comparing the x and y coordinates of each boundary point with the x and y coordinates of neighboring boundary points. Since we are comparing these boundary points in the x – y coordinate system, we are inherently using a distance between

the two points in order to specify our contour). This also meets the limitations of claim 5 in that we are comparing an amount of change in both the horizontal and the vertical directions.

With regard to claim 10, Armato further discloses that the contour recognizing means recognizes a portion where a boundary line between the object region and a region other than the object region changes to be in a concave or a convex form (Armato col. 7 lines 54-57). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Kido's contour recognizing means by adding the ability to detect concave and convex forms as taught by Armato. Such a modification would have allowed for a more robust system that was able to recognize and effectively deal with such concavities.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido as applied to claim 1 above, and further in view of Shinbata (USPN 6,594,380 B2). The arguments as to the relevance of Kido as applied to claim 1 above are incorporated herein.

With regard to claim 9, The Kido reference is insufficient to meet the limitations, because it fails to disclose a radiographing orientation judging means. Shinbata, however, discloses a radiographing orientation judging means for judging a radiographic orientation for an object from the contour based on the feature amount (Shinbata col. 5 lines 31-59: The Shinbata reference discloses determining the radiographic posture (which is analogous to the radiographic orientation recited in the claim) of an object based on the profile (i.e. contour) of a portion of the image. The radiographic posture is determined based on a feature amount.

It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Kido's radiation image processing apparatus by determing the radiographic orientation of extracted objects as taught by Shinbata. Such a modification would have allowed for a system that could automatically detect the posture (orientation) of the subject, and would no longer require this information to be input manually (Shinbata col. 1 lines 39-41). This would have made for a faster system that also avoided unnecessary input errors.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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